NEM Initiative

European Technology Platform

NEM Vision 2030

Towards a future media ecosystem

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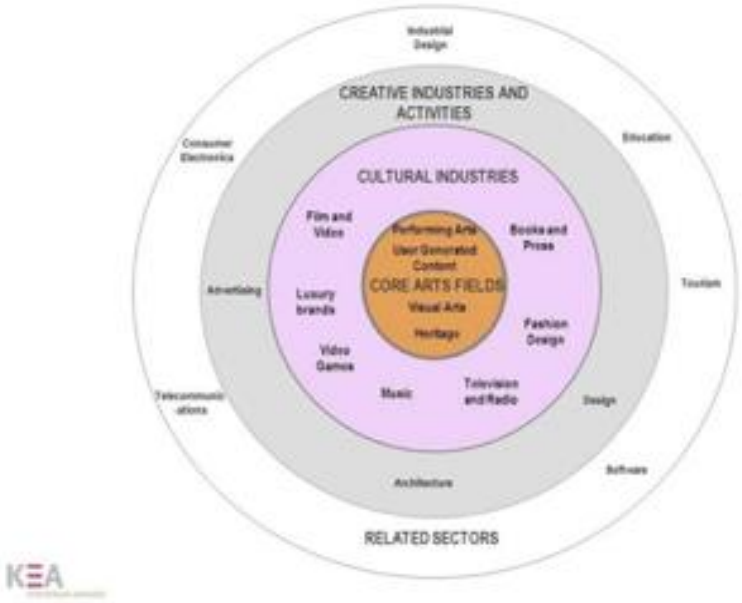
1 Scope

Media and Creative and Cultural industries (CCI) have always been a strong and independent sector in Europe. Currently the networked media ecosystem has grown in the international context, characterized by global players, business activities and market scope on one side and convergence of technical standards one another side. They seem to pivot between two different models led by the USA (centred around large private companies) and China (centred around government), respectively.

The European style, based on our cultural heritage and values, combines the power of the private initiative and government for the good of the people. But Europe needs to work towards a more robust media ecosystem. The underlying network architectures and platforms need to be in European control, and we need to take the regulatory measures, but also the necessary investments to implement it and make it happen. This is what we mean by "independence" of the European media and creative sectors.

New European Media (NEM) understands itself as an agent towards this challenge, assembling media and creative sectors, research, public, private and third sector alike. In this document, we set out our vision for the European media and creative industries sectors, as well as our vision for NEM.

The creative and cultural media sector encompasses a myriad of industries such as television, radio, film, video, games, music, book publishing and journalism. Due to its economic worth and growth, and job creation capacity, it constitutes by far the largest share[1] of the global set of Creative and Cultural industries (CCI).



[1] http://kultur.creative-europe desk.de/fileadmin/user_upload/The_Entrepreneurial_Dimension_of_the_Cultural_and_Creative_Industries.pdf, page 30

Notions of media as "the industries that produce and sell information as well as entertainment products and services"* (Hang & Van Weezel 2007) are necessarily evolving towards new definitions in which technology is deeply imbricated. Nowadays, in the times of social media platforms and OTTs, media industries are those that produce, process, transport, store, distribute and sell information, entertainment products, and services.

Technologies have become a common base in the media sector, and by extension, in all the CCIs. Take for instance, AI, VR/AR or 3-D printing, and the underlying technologies that make them possible (e.g. sensors, 5G, human-machine interfaces, etc.). They all contribute to speed up a process of convergence between the different cultural and creative sectors, including cultural heritage, education, visual arts or fashion.

In return, the CCI contribute to technology advances by posing new creative and practical challenges, and by eagerly willing to act as early adopters for experimental use in content-based innovations. The validation pioneered by CCI have significant spill over effects for other applications as disparate as tourism, health, manufacturing, industrial design, consumer electronics, telecommunications, etc.

Technology-triggered innovation across the CCI and other application sectors is therefore a matter of creating an ecosystem in which all stakeholders, from the ICT research engineers to the artists, can thrive. Symbiosis pays off!

2 Vision

In this context, the NEM community brings forward a concrete vision for European media ecosystem:

> Fostering a **strong and independent European ecosystem** for **media and the creative and cultural industries** to thrive while **embedding core European values** and realising sovereignty in the **digital revolution.**

NEM commits to unify the voices of the whole media and CCI ecosystem, creating technology and content-based innovation roadmaps for the sector to grow. NEM will contribute to bridge the gap between knowledge generation, technology and content-based innovation, and market uptake by strengthening new value chains within and outside the boundaries of media and CCI sector through cross-sectoral collaborations.

NEM strongly recommends this vision is kept in mind for all activities aimed at supporting the media sector and related creative industries.

3 Main values, drivers and goals

Driving factors for the vision are some core values which Europe has always embraced in the past. Those values are cornerstones to define the playground for a future media and CCI ecosystem in Europe, as envisioned and sought by the NEM community:

- To be diverse and pluralistic;
- To be ethical, transparent and accountable;
- To be inclusive, accessible, human-centric and sustainable;
- To be democratic, and supporting of social cohesion;
- To be a lighthouse for media and CCI technology and content-based innovation

We briefly explain each of those core values in the following paragraphs.

3.1 Diverse and pluralistic

NEM is creating bridges for rich and sustainable cooperation between and across technology, policy, cultural and economic players, and to realize an ecosystem of actors that is in fact representative of the diverse and plural Europe.

From an ecosystem perspective, diversity deals with the heterogeneous nature of media and CCI. **Cross-sectoral initiatives** across media and CCI, applications sectors (e.g., education, health, tourism, manufacturing, etc.) and policy and regulation are necessary to create conducive conditions for technology and content-based innovations. Similarly, effective and fruitful **cross-disciplinary collaboration** between researchers and engineers, creative professionals and artists, social scientists, educators, and policy makers, among many more, becomes mandatory to realize plural, meaningful and acceptable research and innovation.

These cross-sectoral and cross-disciplinary spirit will lead to diversity and plurality at all levels. Representativeness of Europe's diversity, for instance in terms of **multilingualism and multi-culturalism** will ensure the best possible conditions for the production and reception of European works and creative services and products. Furthermore, ensuring plurality of ideas, idiosyncrasies and beliefs, as well as appropriate preservation of cultural heritage will also contribute to building collective memory, intelligence and creativity for **improving reflective and inclusive societies** that are resilient to biases and other undesired effects with negative impact on social cohesion and democracy.

3.2 Ethical, transparent and accountable

NEM will encourage a competitive business ecosystem that actively protects rights in all of their dimensions: the rights of consumers and prosumers, creative professionals, entrepreneurs and businesses, etc.

Europe's third way calls for an **ethical, transparent and accountable way** of producing, processing, transporting, storing, distributing and selling information, entertainment products, and services. There is a need for developing and normalizing cost-efficient methods and tools for protecting citizen rights with respect to **privacy, safety, security and fair data management**. Similarly, it is imperative to promote and safeguard ethical practices for **digital rights management and copyright**, including monetization of user generated data and contents.

In parallel, aligned with the *ethical tech* movement that have elicited policy initiatives[2], there is a need to develop and normalize technologies that are **transparent and accountable by-design**. This is, to embrace a human-centric perspective for making sure that new developments will not harm people or their rights, and that they remain **auditable and liable in case of violation**. The urgency is not just to eradicate the obscurity of certain technology-driven business models that leave users in a vulnerable position, but also to continuously **monitor and evaluate new developments for early detection of unintended ethical risks** (e.g., algorithmic discrimination).

3.3 Inclusive, accessible, human-centric and sustainable

NEM commits to mainstream responsible research and innovation approaches for ensuring that technology and content-based innovations, and the business models built around them, are human centric, inclusive, accessible and addresses societal and environmental challenges along the way.

Understanding the barriers that are hindering any individual's full potential to access, consume and produce information is paramount for an **inclusive** digital society. Efforts should not cease for developing technologies that help **remove all kinds of accessibility barriers**, be them due to physical or cognitive challenges, to education or income status, cultural background, or area of residency. Accessibility and inclusiveness is of paramount importance for the media and CCI considering cultural access one of the most important determinant of psychological well-being (preceded only by the absence of disease).)

Furthermore, connected to well-being, there is the issue of **health and environmental impact of technology advancements** for them to be sustainable not just in economic terms. From the raw materials used in hardware manufacturing, to power consumption and life-cycle management, the **road towards green media should no longer be delayed**.

3.4 Democratic and supporting social cohesion

NEM will contribute to strengthening European democratic values and social cohesion by encouraging an empowered, critical and media literate society that thrives in a strong independent and trustworthy media ecosystem.

2 https://ec.europa.eu/digital-single-market/en/news/policy-and-investment-recommendations-trustworthy-artificial-intelligence

Media, and other CCI information and entertainment products, contribute to shape world we all live on. No efforts should be spared in **nurturing empowered, media literate citizens** able to access, actively participate, and position themselves in a world overflown with information. In parallel, appropriate technological means are to be put in place to **counter and prevent disinformation, manipulation, discrimination, radicalization, and other safety and security threats** that hurt democratic values.

As for social cohesion, it has been proven that *cultural participation renders benefits in the fight against poverty, isolation, exclusion and stereotypes* (KEA & PPMI (2019)[3]. It helps create shared values, and encourages intercultural understanding. Technology and content-based innovation has the potential to help the creative and cultural sector **re-connecting and engaging population groups** that cannot access or have lost interest in certain forms of creative and cultural offers.

3.5 A lighthouse for media and CCI technology and content-based innovation

NEM will actively work to consolidate Europe's leadership in technology and content-based innovation for the media and CCI by promoting and fostering an exemplary ecosystem model that is competitive, inclusive, responsible, socially relevant, and worth of being replicated by other economies.

European media and CCI are in a privileged position to consolidate their role in digital single EU market and beyond, leading a path that renders **economic growth while ensuring social and environmental gains**. Concertation initiatives between policy-makers, business and professional associations, research and academic organizations, as a myriad other societal agents, are necessary to **build a model that promotes access to finance, innovation capacity and cross-sectoral cooperation**.

The European model is exemplary as well in acknowledging the **importance of cultural social and content innovations**, i.e. "soft", although it is still necessary to pair its support with respect to technology-driven innovation, This realization requires active work in promoting the skills needed, including **digital, entrepreneurial, traditional and specialized skills** to help CCI to seize the opportunities of globalization and the digital age. **Empowerment of CCI professionals** encompasses as well a solid framework for ensuring **fair remuneration of authors and creators**, and the **protection of their work in the global economy.**

[3] KEA & PPMI 2019, Research for CULT Committee – Culture and creative sectors in the European Union- key future developments, challenges and opportunities, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels.
http://www.europarl.europa.eu/RegData/etudes/STUD/2019/629203/IPOL_STU(2019)629203_EN.pdf

4 10 years from now

The NEM vision will determine the orientation of its activities in the next 10 years. The goal is not just looking at the future, but to **create a future that conforms to the NEM community aspirations**.

In the next few lines, the key trends –as of ends of 2019- are described as starting point. Then, NEM's aspirations for 2030 are listed. These are the result of projecting the trends with the NEM values embedded.

4.1 Technologies

Technology is at the forefront of all new design processes, and in a relatively short period of time, has experienced exponential growth, which has a great impact on almost everything we do, including the way we interact with many things every day.

The progressive integration of machines, networked devices and empowered artificial intelligence systems in our daily experience has boosted the growth of human-machine systems. Main areas of human-machine systems are related to physical and cognitive ergonomics, interaction, learning, risk assessment and 'resilience engineering'.

NEM should foster the creation of an ecosystem where developers can build and sustain useful applications. These applications will require hardware and networks advances (and investments) but in turn they need to be the driving force of the market so that these investments are produced. Key developments challenges to be pursued are size, latency and immersiveness power.

The future is moving from Humane Machine Interaction (HMI) to **Human-Machine Relationships** built upon the ability to learn across domains and enabling the resolution of multiple tasks (in advance). Human-Machine Interaction (HMI) development is taking advantage of the advances of key technologies that have been established during last years, such as for example virtual reality (**VR**) and Artificial Intelligence (**AI**). VR researchers are drawn to its interactive and immersive nature, while the intensive interaction through immersive visual fields has strong research benefits, the responses and validity of different levels of immersion remain a question and the physiological and psychological responses of humans need to be further assessed. AI is providing a revolution on how "intelligent systems" are delivering information to humans taking advantage of new input mechanism (interactions with devices, voice, and gesture) and adaptive-learning software applications. Creating new intelligent virtual assistants that learn from a user's behaviour and anticipate their information needs in real-time ("anticipatory intelligence"). The next wave of virtual assistants will be able to learn and improve over time, looking for more empathy and a deeper understanding of users' preferences. Thus, the future is moving from HMI to Human-Machine relationships built upon the ability to learn across domains and enabling the resolution of multiple tasks (in advance). Moreover, both technologies have been further boosted through progress in telecommunication networks. Further evolutions in this domain will allow for better, faster, higher quality, more mobile applications throughout the media domain, with for now unseen capacity for content production and distribution.

Content innovation and experimentation with **user-driven immersive, interactive, virtual or XR reality experiences**, will eventually need to address two different challenges: (i) adapting contents

upon users' real-time reactions through sensing technologies, and (ii) allowing users to deliberately decide how content develop, ie. user agency.

Novel devices will be able to capture real-time feedback from the user, hopefully under strict privacy-by-design principles. Advanced data analytics and AI methods would be able to transform user's inputs into actionable knowledge for content personalization. Nonetheless, the responses and validity of different levels of immersion remain a question and the physiological and psychological responses of humans need to be further developed. Progress in the field of user experience, including measuring psychophysiological responses, will contribute to a **novel framework for understanding quality of experience beyond technology parameters, and including aspects such as acceptability, meaningfulness, and usefulness**.

The huge evolution of **telecommunication networks** with regards to 5G will offer new capacity for content distribution. 5G networks will be able to adapt themselves to fit the application requirements in terms of Experience data rate, Latency, Reliability (IP packet within latency bound), devices capabilities, Broadcast/Multicast, Battery, Coverage, Mobility, Interwork/roaming, Security, Positioning and External dependencies. Looking to media and CCI applications, specific 5G slices will offer specific value of these parameters in order to support "production" use cases and "distribution" use cases. Expectedly, networks and the platforms will continue under pressure to support ever-growing demand of data and information for ensuring quality of experience.

The above presented trends and further trends in the media and entertainment landscape are supported by continuously developing enabling technologies and emerging media consumption environments. Thus, AI (Artificial Intelligence) and algorithm driven virtual assistants are playing a more and more important role while the end users are consuming the media services. Also, the new generation of devices, e.g. controlled by the users' voice, is significantly contributing to new ways of media consumption and opens new opportunities for all involved actors. Furthermore, the new consumption environments, such as smart homes and connected cars, and the next generation of communications networks (5G) are finally allowing implementation and provision of enhanced media services.

NEM will foster the creation of a favourable ecosystem for building and sustaining relevant applications for the European media and CCI. These applications will require increased public and private investment in enabling technologies, including design of components, hardware and software, making possible advances in size, latency and immersiveness power.

4.2 Business

The rise of the Creative Economy is drawing the spheres of innovation (technological creativity), business (economic creativity), and culture (artistic and cultural creativity) into one another, in more intimate and more powerful combinations than ever. In the last decades Europe has been deciding itself over and over again in favour of a common communication space of "the West". In consequence, Europe have simply adopted innovations from the US West Coast. This is true for operating systems, search, app stores, flat-rate models and many more elements. Technical innovations originating in Europe, such as Skype or Unity have been transferred into the US and changed into a world-leading

position. Other business models coming from Asia (as payment functions from WeChat being implemented into Facebook libra) also reach Europe only through the US applications.

Europe is strong in developing scientific results, but weaker in exploiting them within Europe and globally. Users, including professional users, trust foreign innovations as they usually have considerable economic advantages. In particular, they can provide substantial offer with regards to value for money and trust due to the scale and network effects. **Availability and affordability are certainly decisive if considering 95% of the European cultural and creative sector is formed by micro and small entities**.[5]

The media and CCI ecosystem can rely on cross-sectoral synergies to disrupt the logic of an "end user uptake" which is mainly oriented at user behaviour from outside Europe. An exhaustive **revision of their value chains is necessary to close the gaps between technology and content innovation following a human-centric approach and European values.** Otherwise, unsystematic advancements, in particular when the weakest link is the user and how they evaluate their experiences, penalizes the growth, innovation capacity and sustainability of the entire ecosystem.

The other great challenge is content availability. New ideas and intellectual property (IP) are the basis upon which all CCI stand[4]. As such, and even where technology-driven convergence has blurred the lines between sectors, technologies and services, **content will still be king in the creative economy**[5]. As stated in the European Manifesto on supporting Innovation for cultural and creative sectors[6], the knowledge- and labor- intensive character of creative work should be appreciated when addressing innovation plans.

NEM will work for realising a buoyant media and CCI ecosystem pushes creative boundaries, experiments with new concepts, generate new knowledge around content, narratives and meaningful ways to deliver and evaluate them; and to successfully exploiting them in global markets.

4.3 Society

New media format and new ways of media consumption are creating new challenges to the media ecosystem, opening a debate about trust. Due to the centrality of media in shaping our experiences, habits and values, in fact, **it is essential that the media environment is based on trust and transparency**.

The right to any individual to the privacy is a big challenges for media ecosystem. In the first case, the protection of personal data, above all to protect minors and vulnerable people, must be mandatory. Data, in fact, can be used for dangerous scopes creating serious effects on people's safety, or they can be sold to third parties without asking for permissions and so taking economic advantages. The

[4] [1] KEA & PPMI 2019, Research for CULT Committee – Culture and creative sectors in the European Union- key future developments, challenges and opportunities, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels. http://www.europarl.europa.eu/RegData/etudes/STUD/2019/629203/IPOL_STU(2019)629203_EN.pdf

[5] Creative Economy Outlook: Trends in international trade in creative industries (UNCTAD/DITC/TED/2018/3) 14 Jan 2019

[6] https://www.buchmesse.de/news/arts-european-manifesto

General Data Protection Regulation (GDPR) is a milestone in building transparency and trust for European citizens.

Another crucial element when talking about trusted media environment is about **the use of media to spread disinformation with serious consequences on people**. Due to the complexity of the phenomenon, HLEC[7], nominated by the EC, has elaborated a multi-dimensional approach based on several pillars of intervention to impact on multiple factors, among the others on the adoption of unfair business models (clickbait model) until political interferences.

In this scenario, the role of the media industry is to **develop fair and sustainable business models and deploy technological solutions that actively avoid and counter the proliferation of unethical data and information practices.** In parallel, it is necessary to foster an empowered, **media literate society that can navigate in a world in which media channels are omnipresent** and delivering all sorts of contents to an amount impossible for any human to analytically process.

Media literacy should be understood beyond a defensive strategy for protecting citizens against harmful, and ill-intended manipulation. As argued by Potter (2018), media literacy "stimulates us to adapt to changing communication technologies and open our minds to new media messages". Therefore, it acknowledges that **today's media ecosystem has nurtured new patterns, tastes and ways of consuming, processing, creating and distributing information**. Importantly, it does not assume that the current overwhelming information flood is inherently good or bad, nor contents are right or wrong. By understanding **media literacy as a continually evolving individual stance**[8] it places in **the user the responsibility to decide based on their own skills, knowledge structures and will.**

Furthermore, let us not miss the fact that nowadays **every European citizen is a consumer, as much as a (potential) distributor and generator of media information, products and services**. Take for instance how easy faux-science or clickbait pieces are viralised on social media by well-intended, law-abiding citizens, or how sharing contents without proper permissions or common sense can end up in litigation (e.g. privacy violation, defamation, copyright infringement). This is a powerful game-changer that calls for annulling differences between digital and media literacy. The pervasiveness of digital media in the lives of European citizens made it necessary to **revisit educational curricula to ensure that media literacy is mainstreamed through all levels**, from primary to higher education, with the same relevance traditional literacy and communications skills have been granted so far. **Europeans citizens will remain vulnerable and will not realize their full potential in the creative economy if they are not equipped to responsibly and effectively assume this two-fold role.**

NEM is committed to foster research on the societal impacts of media and CCI technologies and business models, encourage safer and trusted solutions and approaches, and promote media literacy actions.

[7] https://ec.europa.eu/digital-single-market/en/news/final-report-high-level-expert-group-fake-news-and-online-disinformation

[8] [1] Potter, W. J. (2018). Media literacy. Sage Publications.

4.4 NEM's nine priorities for 2030

1. The main challenge of the upcoming decade will be in Human-Machine Interaction and Relationships. Massive usage and new methods and features of interaction between computed power and human beings will have a great impact on almost everything we do and how we interact with many things every day. User uptake is the main indicator as "innovation is fundamentally social"[9].

2. Enhanced capture, communication and interactive technologies will allow the proliferation of new formats supporting richer, convergent, content productions. The use of AI will significantly optimize effort- and time-intensive tasks when dealing with these novel digital assets, in particular, for tasks of low creative value.

3. Novel software tools will allow CCI professionals to create transmedia narratives (i.e. multiplatform storytelling), and user-driven immersive, interactive, virtual or XR reality experiences in an easy and intuitive way. Lighter versions of these tools may be available for tech-savvy citizens for creating own productions, including contents and experiences for educational purposes.

4. Libraries and archives of creative digital assets will proliferate (e.g., characters, voices, audio, virtual environments, UGC, CGI, etc.) These will become available under different licenses options, that will allow authors and owners manage their own assets (e.g., blockchain technologies), and access fair remuneration. Multimodal semantic retrieval will improve the way users can find relevant contents by means of keywords (ie. concepts) even if such items are not properly annotated.

5. Traditional personalisation focused on content delivery based on inferences from tracking data will coexist with user-driven content, meaning the consumer having actual impact on the content itself as they interact and use it. Creative professionals will use novel and adapted conventions to suit the new scripting and creative possibilities, including user-driven experiences.

6. New understanding of consent in the digital era, and the technologies are necessary to guarantee protection to users and enforcing liabilities in case of misuse, negligence or intentional harm by the content provider or third parties. As citizens and regulators grow aware of the value of their data, companies' reputation with regard their data policies, including privacy, fair trade-offs and remuneration for data cession, will determine their success in the European marketplace.

7. New sensing devices equipped with robust computational capacity and embedded software for carrying out in-device analytics are needed to ensure that no private data leaves the user devices to be analysed in a disaggregated or individualized way.

[9] Jane Jacobs quoted in Florida, R (2012), The rise of the creative class, P.109

8. 5G Media slice, integrating networks, machines, sensors, networked devices will enable continuous, pervasive and seamless content production, delivery, consumption, interaction ANYTIME, ANYWHERE, ANY DEVICE.

9. Novel methods for auditing and countering algorithmic bias causing AI systems to inadvertently compromise citizen's ability to access diverse and plural sources of contents become mainstream among content and service providers are crucial and need to be further investigated.

5 Expected impact

5.1 Societal impacts

The media have profound impact on societal aspects while moving its primary role of informing people to something more related to the pervasiveness of the creative sector acquiring the capability to influence people and shape their attitudes and everyday life. This shift has been driven by two main reason: i) new needs of the users and ii) technology innovation. This transformation gave the chance to people to increase the access to information and contents, but also to become "prosumers" and produce own contents and spread it to the world, improving accessibility and equality among the users. Another crucial aspect of this transformation is the capability of media to create community and aggregation in a form that was not possible some years ago.

However, Media and CCI can be crucial also to foster additional societal aspects. Among the others, it is possible to refer to gender issues. As reported under **UNDSG 5 Gender Equality,** Target 5.B it is needed to "*Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women*". In this sense, media and creative and cultural technology can widely affect habits and thinking, this means that the sector can help in the creation of tools and methods for women empowerment.

In addition, media and CCI can also contribute to the **UNDSG 4 Quality of education,** an essential indicator of fair societies, working in particular to target 4.4 that state "*By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship*" As the importance of access to technology is key for the education of any human being, media and creative sector could widely contribute in this direction to improved education and to improve access to knowledge. UNDSG 4 can also make the difference to foster a **protective Europe**. EC states "*Today, keeping citizens safe means fighting crime and terrorism, protecting communities from natural and man-made disasters, thwarting cyber-attacks and guarding against illegal trafficking in people, drugs and counterfeit goods. EU research and innovation is developing new technologies to protect our societies, while respecting privacy and upholding fundamental rights – two core values at the heart of EU security research. These technologies have a significant potential to stimulate economic activity through new products and services and create jobs*". New technologies and approaches developed to protect European societies are also coming from the media and creative community and they can really make the difference in creating solutions to such

urgent issues. For example, media literacy is one of the points that need to be improved in order to guarantee a proper comprehension of information. In this regards, media and creative industry are already at work and should do even more to provide support to this task

NEM intends to drive media and creative community towards the creation of innovation aligned to social needs to foster fair and protective Europe. It is also important to stress the contribution that the sector can provide for a sustainable Europe in i) reducing inequalities, fostering inclusion and improve accessibility using technologies ii) improve democratic processes and transparency thanks to technology and processes developed by creative sector iii) increase awareness and improve participatory processes. Only with integrating and combined methods mixing research, creativity and technology will be possible to find solutions to ongoing and upcoming challenges also supporting decision makers in regulating issues and solving the problem affecting our societies.

5.2 Economical impact

Even though one can say that today's media and entertainment landscape is offering much more than a human being can and has time to consume, this exciting sector is continuously moving forward and is creating new and unpredictable opportunities for end users (consumers of the media services – media and entertainment customers) as well as for professionals and businesses active in the area. The main trends, which are expected to significantly influence development of the entire media and entertainment sector in the coming decade, are:

- Personalization – services tailored to interests and/or particular needs of the individual end users
- Media consumption through OTT (Over-The-Top) services and clear trend where the end users create their own bundles of the media services by combining different OTT offers instead of buying entire media packages from traditional media stakeholders (e.g. cable operators)
- Media and entertainment as a significant enabler for social interaction of humans in the modern world, where the end users are quickly changing their behaviour from passive to active consumers
- Creative industries tackling various aspects of creativity (design, architecture, art, etc.) and more and more not only using the media services and the related ecosystem, but also becoming a significant pillar of the current and the entire future media landscape.

Following one of the main nowadays and future trends in media, namely the increased personalization and corresponding tailored media services for particular end users and/or user groups, the media and entertainment stakeholders will need to pay attention to a "media world of divergence", which should be considered at various individual and global levels. Furthermore, safety and privacy of personal data is seen as one of the largest end user requirements, which can be seen as a constrain, due to increasing number of corresponding regulations to be followed by the media stakeholders, but also as an opportunity, in particular for the stakeholders and newcomers in the area in Europe. Finally, fragmentation across different media platforms, OTT based service bundling by the end users, and similar trends are also opening new opportunities for the media service providers to aggregate various services and tailor them as is needed by the end users.

Concerning the media and entertainment sector, the global revenues are continuously increasing[10] at projected 4.3% CAGR through 2023. Only the global OTT revenues are expected to double until 2023 compared with the figures from 2018.

A very good example of enabling technologies with enormous importance for the future of media and entertainment is development of VR/AR (Virtual Reality / Augmented Reality) technologies, in particular the relevant end user devices. The rapid development of these technologies reflects also figures on global VR revenues, showing their actual growth between 2018 – 2023 (including projected figures for next years) of 22.2% CAGR (Compound Annual Growth Rate)[10], so that the revenues are expected to double from now until 2023. These numbers are also in line with increase of portion of global digital revenues as portion of total revenues, where media and entertainment of course significantly contribute to, which are continuously growing as well; ~41% in 2014, ~55% now (2019), expected to reach ~62% in 2023.

5.3 Technological impact

NEM aims at promoting and directing the large-scale impulse needed to accelerate, through creativity and media technologies, the European pace of innovation and rate of cultural and technological evolution to the level that will place European Industry at the forefront and give users the best and most advanced choice of services.

Technology and human life cannot be separated. In fact, the word *technology* includes two different parts: *techno*, which means application, art or skill, and *logy,* which means science and learning. Therefore, etymologically, the linguistic meaning of the word technology is "*the methods and tools that a society has developed in order to facilitate the solution of its practical problems and to provide the necessary needs for the community"*[11]. History has witnessed that humanity went through several revolutions. The latest one is the revolution of Information and Communication Technology, that is, the NEM core. Today we use NEM technology, we depend on NEM technology in our daily life, and our needs and demands for NEM technology keep on rising. Humans use NEM technology to travel, to communicate, to learn, to educate, to cure diseases, to improve manufacturing, to do business and to live in comfort and healthy in our smart cities.

NEM is providing the strategic vision, industrial leadership, technology disruption, and sectorial forecast, offering new sectorial applications, new cross-domain opportunities and differential business niches to which media technologies can be key for competitive improvement. Considering all those aspects, NEM aims at:

[10] Source PwC Global Entertainment & Media Outlook 2019-2023,

[11] M. B. Younes and S. Al-Zoubi, "The Impact of Technologies on Society: A Review". IOSR Journal Of Humanities And Social Science (IOSR-JHSS), Volume 20, Issue 2, Ver. V (Feb. 2015), PP 82-86, e-ISSN: 2279-0837, p-ISSN: 2279-0845.

- Fostering the transition to digital economy through advanced media-based assets and the integration of cognitive technologies, human-machine systems and new user experience models
- Building a creative approach able to establish synergies between the different contexts and define new spaces of interaction fostering cross and intra domain collaboration.
- Promoting new disruptive user interaction forms for media services and technologies that will lead to new approaches to applications in different areas and new opportunities for content creation, production, consumption and exploitation, with controlled quality of service (QoS) and quality of experience (QoE).
- Being concerned with improving the understanding of human behaviour and facilitating the design and development of media emerging technologies involving the process of interaction design of media-based services
- Focusing on the evolution and trends of an innovative mix of 2D, 3D, real and virtual media forms (as video, audio, animation, text, music, voice, graphics, pictures,…) that live over seamlessly and technologically transparent infrastructure, enabling to improve the quality, enjoyment and value of life, reshaping the relationship between users and media technologies in a wide sense.
- Exploiting the new capabilities of using big data services, blockchain and data science approaches to create new services and widen the spectrum of jobs in areas of cultural and creative industries, health, transport, education, security, smart cities and manufacturing.

NEM fosters the convergence of existing and new/emergent technologies, and covers all the phases of the lifecycle of media, including:

- Capture (of natural content) and/or creation (of synthetic one – Virtual reality, Augmented Reality)
- Processing and manipulation for many different purposes: coding, extraction of features (manually o automatically) for content enrichment and metadata association, curation, user/service profiling, QoS and QoE assessment, trend discovery, consumption recommendation, etc. The technologies involved include digital image processing, computer vision, machine and deep learning, data science, blockchain, etc.
- Storage (locally or remotely, physical or virtual)
- Transmission over simple or intelligent networks, adapting the media to the network or, vice versa, adapting the network to the media. The transmission may be one to one (unicast), one to many (broadcasting, multicasting, streaming), many to one and many to many (peer to peer, etc.).
- Physical interactive and immersive consumption (display, rendering, reproduction, projection, virtualization, etc).

5.4 Regulatory impact

The emerging field of converged and networked media in a creative economy context has not been strictly regulated in the past Today this field has captured central parts of our society and needs more regulatory attention. The time of gold rush is over, we need rules for settlement. This means we need

an alignment of tax regulation in the digital economy. It cannot be that large internet giants do barely pay any taxes in Europe while they are profiting from European economy as a market.

The next revision of the audio-visual media directive needs to widen the scope. Games and large parts of social media are part or the audio-visual sphere and should be regulated in a cultural-economic context. We need to extend audio-visual rules, which provide strict quotas for European content to App stores to European citizens wherever they are based. We need enough public support for European cultural content in these fields. Eventually the AVSD needs to be applied to any platform.

Other issues like competition regulation, copyright, GDPR, regulation on accessibility, regulation on e-privacy, media freedom and pluralism, copyright, regulation of distribution, stronger European grip on protection of minors, regulation on media transparency and trustworthiness as well as data sharing policy need to be addressed.